

Climatic change and the socioeconomic sustainability of the paddy farmers in Malaysia

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ABSTRACT

The changing nature of climatic factors has different impacts on agriculture based areas, periods and crops. Farmers are the most vulnerable group who are affected both directly and indirectly through climatic changes. In the study area in Malaysia, climatic changes have adverse impacts on farmers. Due to climatic change, productivity and profitability of paddy cultivation have declined in the Integrated Agricultural Development Area, North-West Selangor. Farmers perceive that paddy cultivation is no longer profitable due to low productivity as a result of climatic changes. They now prefer full-time to part-time engagement in paddy cultivation. Heavy government subsidy and encouragement are not enough; it requires increase in productivity and profitability of paddy cultivation for making it a viable and sustainable sector. All efforts of mitigation and adaptation must be pursued to counter the adverse impacts of climatic changes and increase the productivity of paddy cultivation in the area. It is observed that there is a high degree of income inequality among the paddy farmers in the study area.

Keywords: Climatic Change; Income Equality; Health Hazard; Agriculture; Paddy; Malaysia

1. INTRODUCTION

The factors affecting climate are changing all over the world. This phenomenon has multidimensional impacts on human livelihoods. Different groups of people are affected in different ways. Among all the sectors, agriculture is highly dependent on climate variables. Due to the changes in climate factors, the factors relevant to agricultural sustainability such as volume, yield, area, and

value of production etc, also change. When the agricultural sustainability is vulnerable, agriculture also varies in several economic factors, such as total production quantity, profit margin of crops, profit margin of final goods, farm and off-farm wage rate etc. As a consequence, the socioeconomic profiles of farm as well as farmers are changing with the changing climate.

Malaysia is one of the vulnerable countries where both agricultural sustainability and related livelihood sustainability are under threat due to the adverse impacts of rapid climatic change. Malaysia ranks as the 26th largest greenhouse gas emitter in the world with a population of about 27 million, and it appears likely to move up the list quickly due to the growth rate of emissions. Here, due to high greenhouse gas emissions, the temperature is projected to rise by 0.3°C - 4.5°C, which will cause the sea level to rise by about 95 cm over a hundred-year period. The changes in rainfall may fluctuate from about -30% to +30%. This change will reduce crop yield and become prone to drought in many areas so that cultivation of some crops such as rubber, oil palm, and cocoa will not be possible [1]. The projection shows that the maximum monthly precipitation will increase up to 51% over Pahang, Kelantan and Terengganu, while minimum precipitation will decrease between 32% to 61% for all over Peninsular Malaysia. Consequently, annual rainfall will increase up to 10% in Kelantan, Terengganu, Pahang and North West Coast, and decrease up to 5% in Selangor and Johor [2]. This variation of climate factors will cause the agricultural system to be vulnerable in Malaysia.

Moreover, the climatic factors affect, directly or indirectly, the social and economic sustainability of the farmers. Climate changes cause crop damages, low productivity and high production cost that leads to losses of farmers' income, poverty level increases, and seasonal unemployment rates increase [3]. This empirical study focuses the socioeconomic sustainability of the paddy farming community under current climatic change scenario in the perspective of Malaysia.

2. METHODOLOGY

To focus on the socioeconomic sustainability of the farmers under the rapid climatic changes in Malaysia, this article obtained partial data from a research project [4] of Institute for Environment and Development (LESTARI), National University of Malaysia (UKM). The data are mostly based on the primary questionnaire survey on paddy producing farmers in the area of Integrated Agricultural Development Area (IADA), North-West Selangor, Malaysia. Among the total population size of 10,300, a sample of 198 respondents is considered for this study. These 198 households cover a total of 577.53 ha of paddy area. The number of sample is proportionately distributed among the eight areas based on the size of the irrigated land area. The sample within the area is selected randomly. The data have been analysed by using descriptive statistics, percentile and scale analysis, and cross sectional regression.

3. RESULT AND DISCUSSION

As the agricultural productivity varies due to climatic change, the income of the farmer also declines and as a consequence, poverty increases. Among the paddy producing farmers, 68.2% agree that paddy production is not very profitable due to low productivity, but 67.2% of the farmers say paddy production is still better than other crops production because of the huge subsidy and incentives for the paddy sector [5]. Due to decreases of income from agriculture, the poverty is still high in the agriculture dependent households [6,7]. Among the farming households, 2.1% of the population live below \$1 dollar poverty line, and 8.2% of the population live below \$2 dollar poverty line; based on Malaysia's poverty line, 3.5% of households or 3.7% of the population live below the poverty line. Outside of IADA area and without the subsidy, the poverty rate is higher than this. Moreover, the subsidy also needs to increase gradually matching the increasing effects of climatic changes to help the farmers cope with income losses; otherwise poverty rate will increase in future. Currently, the target of IADA is to ensure RM 2000 monthly income only from paddy production for each farmer. If only one farmer in each household is considered, there are 44% of the households currently below this level. Thus, a huge increase in income is required to reach the level. Among the paddy farmers, a large number of households (56.6%) have no savings, and 79.8% of the households have no savings except the savings of heads of the household. Therefore, any type of spike in regular life due to natural disaster, disease, crime or social issues can push them towards below poverty line, especially those who are marginally above the poverty line or dependent on loans.

The unexpected behaviour of climatic factors also

causes many negative impacts on human health that affect more on the farming community. 73.7% farmers mention that they face several health problems due to climatic change. A wide range of diseases—vector-borne, water-borne, and respiratory—have links to climatic change. Climatic change is also directly connected to incidences of diarrhea, skin disease, malaria, kala-azar, dengue fever, and other illnesses. Other health related factors, such as dehydration, malnutrition, and heat stress, especially among elder farmers, are closely linked to climatic factors and food production.

When the profitability of agricultural production declines, educated people are less interested in agriculture because of low profitability compared to off-farm wage, but education level of the farmers has significant impacts on paddy yield [8]. A 1% increase in primary level education of a farmer leads to 0.07% increase in paddy yield, and 1% increase in secondary level education of a farmer leads to 0.08% increase in paddy yield. The farmers identified in this study are mostly of old age group, because young people are not interested in agriculture and shift towards SME and industrial sectors. Therefore, the attention towards agriculture decreases and farming is treated as a secondary occupation instead of a main occupation. However, if the secondary occupations amongst farmers increase by 1%, the yield of paddy production decreases by 0.02%. Currently, 17.2% of the farmers are engaged in agriculture on a part-time basis. Many farmers are trying to reduce their involvement in agriculture from full-time engagement to part-time workers because 56.6% think full-time engagement in agriculture is less profitable than part-time engagement.

The household income of farmers is changing from agriculture to other sources such as, non-agricultural wage or salary, business income, spouse income, children income, pension, welfare, land rent, savings or investment return, interest, insurance etc, but the ratio of non-agriculture to agricultural income has significant negative impacts on paddy yield. If the ratio increases by 1%, the yield of paddy productivity declines by 0.01%. However, currently 41.4% of the farmers have incomes from outside of agricultural sources, a maximum of 97.7% for any individual case. On an average, 14.3% of the incomes of paddy farming households come from non-agricultural income.

The land ownership status of the farmers changes over time due to agricultural profitability decline. Due to climatic change, small farmers lose more and are interested to lease land to large farms, and the number of large farm increases due to the opportunity of economies of scale. Among several physical characteristics of the farm, technology and geographical position have significant impacts on paddy yield. 1% increase in the number of machineries leads to 0.06% increase in the productivity of

the paddy. The geographical area also shows significant impacts on paddy production, such as Sg. Burong shows positive impacts on yield where the elasticity value is 0.02. Thus, large farms take this opportunity of economics of scale and high productivity incentives from government. As a result, this leads to more income inequality among the farmers. Therefore, top 20% of the farmers receive 46.8% of the income and the bottom 20% receive only 5.6% of the income. The degree of inequality for Kuznets ratio is nearly three times (2.88) and the Gini coefficient is 0.443 indicating quite a high level of inequality in the agricultural community.

Government makes rules to produce a particular crop in a particular area but farmers' tendency increases to different crops due to the differences in profitability rates. The IADA area is allowed only for paddy production, but 41.9% of paddy producing farmers are engaged in livestock or other crops production, and one third of the farmers have incomes from permanent plants such as, mango, coconut, palm oil, cocoa, banana etc. It is alarming because the fields used for permanent trees are not possible to revert back for paddy. Farmers also like to produce seasonal crops, seasonal fruits, and seasonal vegetables. Farmers' choices depend on the income that is ultimately derived from profit margin changes among crops or final crops due to climatic change. As a result, expected areas of cultivation for a particular crop differ from actual cultivated areas. In some cases, farmers are not interested to cultivate land and as a result, total cultivated land also differs from cultivatable land. The average decrease of paddy land reported by the IADA authorities for the last three years was 0.34% [9], and it is likely to decrease over the next seasons, because 7.1% of the farmers said that they are not willing to produce paddy in the next season. Among other socioeconomic particulars of farmers, the productivity of Malay farmers in terms of Chinese (race) shows statistically significant relationship where the elasticity is -0.4 .

Currently, government provides a huge subsidy (input subsidy, price subsidy, paddy production incentives, YIELD Increase Incentives, free irrigation infrastructures, and water supply) to promote and increase paddy production. Government subsidy for agricultural sector is increasing each year [10]. The subsidies for urea and compound fertilizer have been continuing since 1979. The incentive for land preparation and organic fertilizer has been continuing since 2007. Providing compound and urea fertilizers and pesticide incentives was introduced in 2008 and is still continuing. In spite of these supports, still 12.1% of the farmers cannot cope with climatic changes with the current level of supports. Due to productivity decreases, farmers' dependency on external supports increases to maintain a certain level of regular income.

4. CONCLUSION AND RECOMMENDATIONS

Overall, climatic change influences the agricultural sustainability negatively in Malaysia; as a consequence people who are dependent on agriculture are more vulnerable in terms of socioeconomic perspective than other social groups in Malaysia. Adaptation is very essential in the long run for agricultural and livelihood sustainability in Malaysia. Adaptation approaches need to be followed at an individual farmer level and policy level [11,12]. Adaptation will be highly dependent on technology in the long-run, and financial protection in the short-run. Government bodies too need to offer preferable subsidy policies and ensure financial sustainability for the farmers.

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